

**APPENDIX H**

# **SELECTION OF THE PROPOSED ACTION**

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## Acronyms/Abbreviations

AF	acre-foot/feet
cfs	cubic feet per second (not ft <sup>3</sup> /s)
IDC	interest during construction
OM&R	operation, maintenance, and replacement
Se	selenium
TDS	total dissolved solids

Appendix H presents a discussion of the criteria, factors, and evaluation scales used to select the proposed action from the four principal disposal alternatives in October 2002: Ocean Disposal (at Point Estero), Delta-Chipps Island and Delta-Carquinez Strait Disposal Alternatives, and In-Valley Disposal Alternative. The criteria and factors are identified by their number in the matrix shown in Table H-1. This appendix is organized in sections according to the following criteria:

- H1 Cost (1)
- H2 Cost Effectiveness (2)
- H3 Agricultural Productivity (3)
- H4 Time to Implement (4)
- H5 Public Concern (5)
- H6 Legal and Institutional Constraints (6)
- H7 Flexibility to Meet Changing Conditions (7)
- H8 Land Impacts (8)
- H9 Risk (9)

## **H1            COST**

Table H-2 provides the cost information for the four screening factors, 1A through 1D.

- 1A Annual Equivalent Cost (\$1,000)
- 1B Construction and Periodic Replacement Costs (\$1,000)
- 1C Discounted Value of Conservation, IDC, and Periodic Replacement Costs (\$1,000)
- 1D Discounted Value of Annual OM&R and Energy Costs (\$1,000)

Construction costs are costs identified as direct construction costs of physical property in engineering cost estimates that are necessary for installation of a project. They include the purchased cost of materials and services including those necessary for the avoidance of adverse environmental effects and public health and safety risks. Construction costs are based on current market values.

Contingency costs are project costs that reflect unforeseen construction problems or conditions that may occur during project construction and implementation. They are usually an estimated percentage of total construction costs.

Annual operation, maintenance, and replacement (OM&R) costs are the value of goods and services needed to operate a constructed project and make repairs and replacements necessary to maintain the project in sound operating condition during its economic life. These OM&R costs include the costs incurred by Reclamation and, where appropriate, contributed by other Federal or nonFederal entities. Costs represent annual equivalent expenditures for personnel, equipment, supplies, replacements, power, administration, etc., at current price levels. In cases where progressive stages of development require changes in annual expenditures, the

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**Table H-1**  
**Screening Criteria/Factors and Scores for Selection of the Proposed Action**

		Ocean Disposal	Delta Disposal		In-Valley Disposal
		Point Estero	Chippis Island	Carquinez Strait	
COST					
1	Cost				
1A	Annual Equivalent Costs (\$1,000)	\$74,026	\$56,548	\$61,225	\$50,288
1B	Construction Costs (\$1,000)	\$969,262	\$812,472	\$882,472	\$709,142
1C	Discounted Value of Construction, IDC Costs (\$1,000)	\$911,342	\$716,741	\$788,885	\$589,583
1D	Discounted Value of Annual OM&R and Energy Costs (\$1,000)	\$235,387	\$159,234	\$159,544	\$189,425
2	Cost Effectiveness				
2A	Cost per \$ of gross-farm income	NA	NA	NA	NA
2B	Cost per acre remaining in production	\$633	\$484	\$524	\$451
3	Agricultural Productivity				
3A	Long Term Salt Balance	5	5	5	5
3B	Yield Impacts of Soil Salinity	5	5	5	5
3C	Agricultural Production Costs Avoided by Action	5	5	5	5
	Average Agriculture Productivity	5	5	5	5
IMPLEMENTATION					
4	Time to Implement	2	3	3	5
	Estimated Time to Provide Service (from 1/1/05)				
	AVERAGE AGRICULTURE PROD. & TIME TO IMPLEMENT	3.5	4	4	5
5	Public Concern				
5A	Source Water Quality	5	1	2	4
5B	Aquatic Resources	1	1	1	5
5C	Surface Exposure to Selenium	5	2	3	1
5D	Resource Reuse and Recycling	1	1	1	4
5E	Impact to Acres in Production	2	2	2	1
	Average Public Concern	2.8	1.4	1.8	3
6	Legal & Institutional Constraints				
6A	Complexity of Permitting Process	3	1	2	4
6B	Uncertainty of Permitting Process	3	1	1	3
	Average Legal & Institutional Constraints	3	1	1.5	3.5
7	Flexibility to Meet Changing Conditions				
7A	Potential Future Regulations	5	1	2	5
7B	Changes in Drainage Quantity and Quality	3	2	3	5
	Average Flexibility	4	1.5	2.5	5
	AVERAGE PERMITTING AND IMPLEMENTABILITY	3.5	1.25	2.0	4.3
ENVIRONMENTAL IMPACTS					
8	Land Impacts				
8B	Construction Impacts				
8B.1	Rare/protected terrestrial habitats and special status species	2	3	2	4
8B.2	Urban Corridor	4	3	2	5
8A	Operation Impacts				
8A.1	Rare/protected terrestrial habitats and special status species	4	3	3	3
8A.2	Urban Corridor	4	3	3	5
	Average Land Impacts	3.5	3	2.5	4.25
9	Risk				
9A	Hazards				
9A.1	Earthquake	2	3	3	4
9A.2	Floods	3.5	3.5	3.5	4
9B	Environmental				
9B.1	Drinking Water Supply	5	2	3	5
9B.2	Salt Disposal	5	2	3	3
9B.3	Potential for Wildlife Exposure to Selenium	4	1	2	2
	Average Risk	3.9	2.3	2.9	3.6
	AVERAGE ENVIRONMENTAL IMPACTS	3.7	2.65	2.7	3.925

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### Selection of the Proposed Action

**Table H-2**  
**Disposal Alternatives Estimated Costs**

Alternative	Area Drained (acres)	Drainage Volume Before Reuse (AF/yr)	Drainage Volume after Reuse (AF/yr)	1B Construction & Periodic Replacement Costs (\$1,000)	Annual OM&R Costs (\$1,000)	Annual Energy Costs (\$1,000)	1C Discounted Value of Construction, IDC, & Periodic Replacement Costs (\$1,000)	1D Discounted Value of Annual OM&R Costs (\$1,000)	1D Discounted Value of Annual Energy Costs (\$1,000)	Discounted Value of Total Alternative Costs (\$1,000)	1A Annual Equivalent Cost (\$1,000)	Annual Cost Per Acre (\$)	Annual Cost per Acre-Foot before Reuse (\$)	Annual Cost per Acre-Foot after Reuse (\$)
<b>Ocean Disposal Alternative</b>														
Point Estero Aqueduct - 41 cfs	241,663	108,856	29,391	\$969,262	\$10,757	\$8,900	\$911,342	\$97,518	\$137,869	\$1,146,728	\$74,026	\$306	\$680	\$2,519
<b>Delta Disposal Alternatives</b>														
<b>Delta Disposal Alternatives w/ Lagoon Se Treatment Option</b>														
Kesterson to Chipps Island - All Pipe - 41 cfs	241,663	108,856	29,391	\$862,472	\$14,663	\$1,587	\$768,272	\$134,783	\$23,676	\$926,731	\$59,824	\$248	\$550	\$2,035
Kesterson to Chipps Island - Canal & Pipe - 41 cfs	241,663	108,856	29,391	\$812,472	\$14,713	\$1,587	\$716,741	\$135,558	\$23,676	\$875,975	\$56,548	\$234	\$519	\$1,924
Kesterson to Carquinez Strait - All Pipe - 41 cfs	241,663	108,856	29,391	\$932,472	\$14,683	\$1,587	\$840,416	\$135,093	\$23,676	\$999,185	\$64,501	\$267	\$593	\$2,195
Kesterson to Carquinez Strait - Canal & Pipe - 41 cfs	241,663	108,856	29,391	\$882,472	\$14,733	\$1,587	\$788,885	\$135,868	\$23,676	\$948,428	\$61,225	\$253	\$562	\$2,083
<b>Delta Disposal Alternatives w/ High-Rate Se Treatment Option</b>														
Kesterson to Chipps Island - All Pipe - 41 cfs	241,663	108,856	29,391	\$847,101	\$19,838	\$1,886	\$757,382	\$192,882	\$26,870	\$977,134	\$63,078	\$261	\$579	\$2,146
Kesterson to Chipps Island - Canal & Pipe - 41 cfs	241,663	108,856	29,391	\$797,101	\$19,888	\$1,886	\$705,851	\$193,657	\$26,870	\$926,377	\$59,801	\$247	\$549	\$2,035
Kesterson to Carquinez Strait - All Pipe - 41 cfs	241,663	108,856	29,391	\$917,101	\$19,858	\$1,886	\$829,526	\$193,192	\$26,870	\$1,049,588	\$67,755	\$280	\$622	\$2,305
Kesterson to Carquinez Strait - Canal & Pipe - 41 cfs	241,663	108,856	29,391	\$867,101	\$19,908	\$1,886	\$777,995	\$193,967	\$26,870	\$998,831	\$64,479	\$267	\$592	\$2,194
<b>In-Valley Disposal Alternative</b>														
In-Valley Disposal w/ High-Rate Se Treatment - 40 cfs	236,163	106,679	28,803	\$718,692	\$22,448	\$1,256	\$596,349	\$234,130	\$16,924	\$847,402	\$54,703	\$232	\$513	\$1,899
In-Valley Disposal w/ Lagoon Se Treatment - 40 cfs	236,163	106,679	28,803	\$709,142	\$17,231	\$965	\$589,583	\$175,609	\$13,816	\$779,008	\$50,288	\$213	\$471	\$1,746

various levels of annual costs are discounted to their present worth and then converted to annual equivalent values by application of the appropriate discount rate and period of analysis.

Interest during construction (IDC) is applicable to expenditures made during the construction period and accrues up to the time when benefits first begin in the form of services from the facilities constructed. Compound interest is computed and is charged on investment costs remaining after deduction of investigation costs prior to authorization. The construction period will be documented by the entity providing the estimated project construction costs.

Postauthorization advance planning and preconstruction costs are included as a part of the implementation cost.

Annual equivalent costs are costs reduced to a series of equal annual payments that, when discounted and summed, have the same total value as the initial outlay.

Discounted costs are costs that are discounted to a certain period. Discounting reflects how the value of money varies through time. The present value of a future cost is the amount of money that would need to be invested today, at the project discount rate, to have the specified future cost available when it was predicted to occur.

## **H2            COST EFFECTIVENESS (2)**

### **H2.1            Cost per \$ of Gross Farm Income (2A)**

The values for the gross farm income have not been made available and, therefore, no values have been calculated for this criterion.

### **H2.2            Cost per Acre Remaining in Production (2B)**

The drained acres for acres remaining in production have been used for this second measure of cost effectiveness. The values are higher than those shown in Table H-2, Disposal Alternatives Estimated Costs, since acres drained should also be discounted (and annualized) before computing cost per acres drained. A schedule for acres drained for the Out-of-Valley Alternatives was not available, so 5,500 acres were added to every year shown in Table H-3. The effect of doing this is to minimize the per acre drained cost differences between In-Valley and Out-of-Valley Disposal Alternatives. If the 5,500-acre difference is the ultimate difference (with a gradual buildup), the cost per acre drained for Out-Of-Valley Disposal Alternatives would be greater than what is shown.

## **H3            AGRICULTURAL PRODUCTIVITY (3)**

The objectives of providing drainage service are to maintain long-term agricultural productivity, to reduce the accumulation of salts in the soil and groundwater, and to reduce costs associated with trying to farm under poorly drained and saline conditions. The three evaluation criteria under Agricultural Productivity are used to judge whether these three objectives are expected to be achieved by the alternatives. The three criteria are defined as follows:

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**Table H-3**  
**Projected Drainage Quantities**

Year	Acres Drained				Drainage w/o Source Control (AF)				Drainage With Source Control (AF)					Drainage After Reuse (AF)				
	Northerly Area	Westlands North	Westlands Central	Westlands South	Northerly Area	Westlands North	Westlands Central	Westlands South	Northerly Area	Westlands North	Westlands Central	Westlands South	Total	Northerly Area	Westlands North	Westlands Central	Westlands South	Total
1	48,000	5,000	0	0	44,200	2,500	0	0	37,220	2,500	0	0	39,720	10,049	675	0	0	10,724
2	48,333	7,750	3,107	3,108	44,400	3,875	1,553	1,554	35,938	3,111	1,207	1,203	41,460	9,703	840	326	325	11,194
3	48,667	9,128	4,488	4,489	44,600	4,564	2,244	2,245	34,658	3,665	1,744	1,738	41,804	9,358	989	471	469	11,287
4	49,000	10,506	5,869	5,870	44,800	5,253	2,934	2,935	33,379	4,218	2,280	2,272	42,150	9,012	1,139	616	614	11,380
5	49,333	11,883	7,250	7,252	45,000	5,942	3,625	3,626	32,102	4,771	2,817	2,807	42,497	8,668	1,288	761	758	11,474
6	49,667	13,261	8,630	8,633	45,200	6,631	4,315	4,316	30,827	5,324	3,354	3,342	42,846	8,323	1,437	905	902	11,568
7	50,000	14,639	10,011	10,014	45,400	7,319	5,006	5,007	31,153	5,877	3,890	3,876	44,797	8,411	1,587	1,050	1,047	12,095
8	50,333	16,017	11,392	11,395	45,600	8,008	5,696	5,698	31,481	6,430	4,427	4,411	46,749	8,500	1,736	1,195	1,191	12,622
9	50,667	17,394	12,773	12,776	45,800	8,697	6,387	6,388	31,811	6,983	4,963	4,946	48,703	8,589	1,886	1,340	1,335	13,150
10	51,000	18,772	14,154	14,158	46,000	9,386	7,077	7,079	32,142	7,536	5,500	5,480	50,659	8,678	2,035	1,485	1,480	13,678
11	51,333	19,099	15,373	15,504	46,200	9,549	7,687	7,752	32,475	7,667	5,974	6,002	52,118	8,768	2,070	1,613	1,620	14,072
12	51,404	20,173	16,668	16,614	46,242	10,087	8,334	8,307	32,546	8,099	6,477	6,431	53,552	8,787	2,187	1,749	1,736	14,459
13	51,474	21,248	17,962	17,724	46,284	10,624	8,981	8,862	32,616	8,530	6,980	6,861	54,987	8,806	2,303	1,884	1,852	14,846
14	51,544	22,323	19,257	18,834	46,326	11,161	9,628	9,417	32,687	8,962	7,483	7,290	56,422	8,825	2,420	2,020	1,968	15,234
15	51,614	23,398	20,551	19,943	46,368	11,699	10,276	9,972	32,757	9,393	7,986	7,720	57,856	8,844	2,536	2,156	2,084	15,621
16	51,684	24,472	21,846	21,053	46,411	12,236	10,923	10,527	32,828	9,825	8,489	8,150	59,291	8,863	2,653	2,292	2,200	16,009
17	51,754	25,547	23,141	22,163	46,453	12,774	11,570	11,081	32,898	10,256	8,992	8,579	60,726	8,883	2,769	2,428	2,316	16,396
18	51,825	26,622	24,435	23,273	46,495	13,311	12,218	11,636	32,969	10,688	9,495	9,009	62,161	8,902	2,886	2,564	2,432	16,783
19	51,895	27,697	25,730	24,383	46,537	13,848	12,865	12,191	33,040	11,119	9,998	9,438	63,596	8,921	3,002	2,699	2,548	17,171
20	51,965	28,772	27,024	25,492	46,579	14,386	13,512	12,746	33,111	11,551	10,501	9,868	65,031	8,940	3,119	2,835	2,664	17,558
21	52,035	29,846	28,319	26,602	46,621	14,923	14,159	13,301	33,182	11,982	11,004	10,298	66,466	8,959	3,235	2,971	2,780	17,946
22	52,105	30,921	29,613	27,712	46,663	15,461	14,807	13,856	33,253	12,414	11,507	10,727	67,901	8,978	3,352	3,107	2,896	18,333
23	52,175	31,996	30,908	28,822	46,705	15,998	15,454	14,411	33,324	12,845	12,010	11,157	69,336	8,998	3,468	3,243	3,012	18,721
24	52,246	33,071	32,203	29,931	46,747	16,535	16,101	14,966	33,395	13,277	12,513	11,586	70,772	9,017	3,585	3,379	3,128	19,108
25	52,316	34,145	33,497	31,041	46,789	17,073	16,749	15,521	33,467	13,708	13,016	12,016	72,207	9,036	3,701	3,514	3,244	19,496
26	52,386	35,220	34,792	32,151	46,832	17,610	17,396	16,076	33,538	14,140	13,519	12,446	73,643	9,055	3,818	3,650	3,360	19,883
27	52,456	36,295	36,086	33,261	46,874	18,147	18,043	16,630	33,609	14,571	14,022	12,875	75,078	9,075	3,934	3,786	3,476	20,271
28	52,526	37,370	37,381	34,371	46,916	18,685	18,690	17,185	33,681	15,003	14,525	13,305	76,514	9,094	4,051	3,922	3,592	20,659
29	52,596	38,444	38,675	35,480	46,958	19,222	19,338	17,740	33,753	15,434	15,028	13,734	77,949	9,113	4,167	4,058	3,708	21,046
30	52,667	39,519	39,970	36,590	47,000	19,760	19,985	18,295	33,824	15,866	15,531	14,164	79,385	9,133	4,284	4,193	3,824	21,434
31	52,737	40,594	41,265	37,700	47,042	20,297	20,632	18,850	33,896	16,297	16,034	14,594	80,821	9,152	4,400	4,329	3,940	21,822
32	52,807	41,669	42,559	38,810	47,084	20,834	21,280	19,405	33,968	16,729	16,537	15,023	82,257	9,171	4,517	4,465	4,056	22,209
33	52,877	42,744	43,854	39,919	47,126	21,372	21,927	19,960	34,040	17,160	17,040	15,453	83,693	9,191	4,633	4,601	4,172	22,597
34	52,947	43,818	45,148	41,029	47,168	21,909	22,574	20,515	34,112	17,592	17,543	15,882	85,129	9,210	4,750	4,737	4,288	22,985
35	53,018	44,893	46,443	42,139	47,211	22,447	23,221	21,070	34,184	18,023	18,046	16,312	86,565	9,230	4,866	4,873	4,404	23,373
36	53,088	45,968	47,738	43,249	47,253	22,984	23,869	21,624	34,256	18,455	18,549	16,741	88,002	9,249	4,983	5,008	4,520	23,760
37	53,158	47,043	49,032	44,359	47,295	23,521	24,516	22,179	34,328	18,886	19,052	17,171	89,438	9,269	5,099	5,144	4,636	24,148
38	53,228	48,117	50,327	45,468	47,337	24,059	25,163	22,734	34,400	19,318	19,556	17,601	90,874	9,288	5,216	5,280	4,752	24,536
39	53,298	49,192	51,621	46,578	47,379	24,596	25,811	23,289	34,473	19,749	20,059	18,030	92,311	9,308	5,332	5,416	4,868	24,924
40	53,368	50,267	52,916	47,688	47,421	25,134	26,458	23,844	34,545	20,181	20,562	18,460	93,747	9,327	5,449	5,552	4,984	25,312
41	53,439	51,342	54,210	48,798	47,463	25,671	27,105	24,399	34,617	20,612	21,065	18,889	95,184	9,347	5,565	5,687	5,100	25,700
42	53,509	52,417	55,505	49,908	47,505	26,208	27,752	24,954	34,690	21,044	21,568	19,319	96,620	9,366	5,682	5,823	5,216	26,088
43	53,579	53,491	56,800	51,017	47,547	26,746	28,400	25,509	34,763	21,475	22,071	19,749	98,057	9,386	5,798	5,959	5,332	26,475
44	53,649	54,566	58,094	52,127	47,589	27,283	29,047	26,064	34,835	21,907	22,574	20,178	99,494	9,406	5,915	6,095	5,448	26,863
45	53,719	55,641	59,389	53,237	47,632	27,820	29,694	26,618	34,908	22,338	23,077	20,608	100,931	9,425	6,031	6,231	5,564	27,251
46	53,789	56,716	60,683	54,347	47,674	28,358	30,342	27,173	34,981	22,770	23,580	21,037	102,368	9,445	6,148	6,367	5,680	27,639
47	53,860	57,790	61,978	55,456	47,716	28,895	30,989	27,728	35,054	23,201	24,083	21,467	103,805	9,465	6,264	6,502	5,796	28,027
48	53,930	58,865	63,272	56,566	47,758	29,433	31,636	28,283	35,127	23,633	24,586	21,897	105,242	9,484	6,381	6,638	5,912	28,415
49	54,000	59,940	64,567	57,676	47,800	29,970	32,284	28,838	35,200	24,064	25,089	22,326	106,679	9,504	6,497	6,774	6,028	28,803

## Appendix H

### Selection of the Proposed Action

- Criterion 3A is an assessment of **Long-term Salt Balance**. This term is defined for evaluation purposes as the net change in mass of salts in the root zone and shallow groundwater, relative to the No Action Alternative. Salt mass is defined as total dissolved solids (TDS), and shallow groundwater salts are estimated down to a 20-foot depth below surface.
- Criterion 3B is an assessment of the potential crop **Yield Impacts of Soil Salinity**. Soil salinity is the level of dissolved salts in the crop root zone. It can be measured either as ppm of TDS in root zone soil moisture or, more commonly, as the electrical conductivity of a soil saturation extract.
- The effects of poor drainage and salinity conditions can be partially and perhaps temporarily alleviated by more intensive irrigation management, but at a cost. When these costs exceed what growers are willing to pay, land will go out of production. The costs associated with higher irrigation management and lands going out of production in the No Action Alternative can be reduced if adequate drainage is provided. Criterion 3C is an assessment of the **Agricultural Production Costs Avoided by Action Alternatives**.

The following scale was developed for screening the alternatives:

Scale	Agricultural Productivity
1	Significant deterioration relative to No Action
2	Moderate deterioration relative to No Action
3	No change or unable to judge
4	Moderate improvement relative to No Action
5	Significant improvement relative to No Action

All of the alternatives provide roughly equivalent levels of drainage service, with relatively minor differences occurring because of acreage needed for the treatment and disposal components (in particular, the In-Valley Disposal Alternatives require some additional lands evaporation pond disposal). All of the alternatives are judged to provide significant improvement for all of the Agricultural Productivity criteria.

#### H4 TIME TO IMPLEMENT (4)

This criterion is intended to evaluate the time in which each alternative will be able to provide drainage service to the San Luis Unit. The In-Valley and Out-of-Valley work groups developed an implementation schedule of activities for design and construction of each alternative that would commence once the Record of Decision is signed. Factors used by the team in developing the schedule included engineering design, land acquisition, and a phased construction process. It was assumed that the time for engineering design and land acquisition would be sufficient to apply and acquire all necessary construction permits. The primary constraints on the schedule of construction activities are the likely amount of funding that would be made available to Reclamation each year, the amount of contracts that could be awarded at the same time, and the dependencies of the specific components of the drainage plan.



#### **H4.1 Scoring**

Several ways exist to evaluate the time to implement each alternative. The question of when “drainage service” begins is subject to several interpretations. However, for this analysis, “drainage service” will begin as soon as final disposal is available. Originally, the number of years (natural scale) was used directly. For the second screening, a constructed scale was developed. The scoring for this criterion is on a scale of one to five and the scale is as follows:

5	The plan that provides “drainage service” the fastest or within 20 percent
4	Provides “drainage service” within 40 percent of the fastest
3	Provides “drainage service” within 60 percent of the fastest
2	Provides “drainage service” within 80 percent of the fastest
1	Provides “drainage service” in longer than 80 percent of the fastest

#### **Results**

<b>Disposal Alternative</b>	<b>Years Before Some Drainage Begins (from 1/1/05)</b>	<b>Difference From Quickest Alternative (Years)</b>	<b>Difference From Quickest Alternative (percent)</b>	<b>Score (1-5)</b>
In-Valley	5.75 (9/29/10)	0	0	5
Delta-Chipps	8.75 (10/4/13)	3	52	3
Delta-Carquinez	8.75 (10/4/13)	3	52	3
Ocean Disposal	9.75 (10/3/14)	4	70	2

#### **H5 PUBLIC CONCERN (5)**

The Public Involvement Work Group for the San Luis Drainage Feature Re-evaluation developed an approach to evaluate public concerns about the final San Luis Drainage alternatives. This criterion is intended to evaluate the relative degree of concern about the alternatives for comparative purposes. The team acknowledges that new waste disposal facilities of any kind cause public concerns in locally affected areas. On one level, all of the alternatives cause public concern and could be considered unacceptable. However, the team sought to go beyond the simplified response “we don’t want it” to understand the features of an alternative that might cause concern to determine if an alternative has more or fewer concerns when compared to the other alternatives. The team recognizes that many concerns are based on perceptions rather than actual scientific risk or impact; however, the scientific comparison of alternatives is addressed in other criteria. Therefore, the team focused on major issues of concern to the public and interest groups as expressed in this and previous studies and understood by the team.

In considering public concerns, the team focused on the broad public issues associated with an alternative. That is, does an alternative include elements or components that are stated concerns from members of the public?

## **H5.1 Public Concerns**

The team identified the following five major public concerns:

- **Source Water Quality (5A)** – Does an alternative have perceived impacts to freshwater supplies for agricultural or urban use, including groundwater and surface water?
- **Aquatic Resources (5B)** – Does an alternative have perceived impacts on special or protected aquatic resource areas, water quality, and fisheries or biota?
- **Surface Exposure to Selenium (5C)** – Does an alternative include substantial areas of open water resulting in perceived exposure of wildlife to selenium (Se)?
- **Resource Re-Use and Recycling (5D)** – To what degree does an alternative include reuse or recycling of water or other constituents?
- **Impact to Acres in Production (5E)** – Does an alternative result in substantial acres of agricultural land converted for drainage service facilities?

The Public Involvement Work Group agreed to these issues for the following reasons:

- These issues describe the major issues of interest to stakeholders.
- These issues generally have a similar level of importance or concern.
- Each of the major stakeholder interests (farmers and farming interests, environmental groups, agencies and water providers) have issues on this list.

In developing this list, the team identified issues about which one or more interests may have concerns. The issues are intended to provide a quick and relatively simple method for differentiating among alternatives. For each disposal concept (Ocean, Delta, and In-Valley), the team assessed whether an issue was a public concern for that concept. At this point, this list only identifies the likelihood that an alternative would cause concern and is not a measure of actual acceptability or acceptance.

## **H5.2 Scoring**

For each issue, the team considered the level of public acceptability on a scale of 1 to 5 (1 is least acceptable and 5 is most acceptable when compared to other alternatives). This evaluation was generally subjective, considering the previous public comments and perceptions about alternatives and the general information known now about the components of an alternative and the size and location of potential facilities. Once the team assigned a score for each issue, the scores were totaled and averaged for each disposal concept.

## **H5.3 Issues and Approaches Considered but not Adopted**

The team determined that an alternate method, the stated opposition from groups or communities, was not appropriate at this time because it would be based on insufficient information about organizations in the project area and their stated positions at this time. The next stage of the evaluation will develop more detailed information about the alternatives and potential impacts and public issues and concerns about the alternatives.

The team also considered two potential public concerns and concluded that they were not appropriate measures of public concern at this time:

**On-Farm Operational Burden** – Does an alternative result in increased operational or regulatory burden on farm operations? The team concluded that since all alternatives included the same level of on-farm activities, this factor would not distinguish among the alternatives.

**Open Space Creation** – The team considered that creating open space might be a positive benefit for some stakeholders and increase the acceptability of an alternative. The team removed the Open Space Creation issue from further consideration at this time because it was not an issue at the same level of public concern and importance as the other issues and as a potential positive benefit it was not easily captured in the issue tabulation process. For example, for the in-valley solutions that used extensive evaporation ponds an alternative would be more unacceptable for Production Acres Impact and more acceptable (positive benefits) for Open Space Creation (for alternative wildlife attraction mitigation), so they would cancel out in almost all cases.

## **H6 LEGAL AND INSTITUTIONAL CONSTRAINTS (6)**

The following criteria were considered to evaluate the complexity in the permit process: the number of permits, complexity of permits, and uncertainty of obtaining a permit. The number of permits for the various alternatives is not a distinguishing factor because the difference between the smallest and the largest number of permit requirements is only 1 in 24.

### **H6.1 Complexity of Permitting Process (6B)**

The complexity of the permits depends upon the number and types of permits. Discharge permits involve many approving agencies and a complex public hearing process, while a permit for lease or easement across California State lands involves only one agency's approval, the State Lands Commission with a limited number of issues. Complexity increases drastically if changes occur for current water uses and quality, biologically sensitive areas are impacted, and special interest groups have been organized to protect or enhance the receiving areas, such as San Francisco Bay and the Sacramento-San Joaquin River Delta. The scoring for this criterion is as follows:

5	<b>No Permit Constraints</b> – No identified permit conflicts or permitting uncertainties; permit approvals can be granted by local or district authority. Water quality changes and impacts to other water users are minimal in local area.
4	<b>Minimal Permit Constraints</b> – Challenging permit issues limited to local permit requirements. Challenging permit issues limited to one area of State or Federal permit process. Water quality changes and impacts to other water users are minimal in local area. Sensitive biological resources have no or minimal changes.
3	<b>Moderate Permit Constraints</b> – Challenging permit issues limited to two or less areas of State or Federal permit processes. Permit approvals can be granted by local or district or State authority. Water quality changes and impacts to other water users are few in local area. Sensitive biological resources have minimal changes.
2	<b>Substantial Permit Constraints</b> – Challenging permit issues include multiple local permits <u>and</u> two or more State or Federal permit requirements; permit approvals may require variance for special consideration by local, district, or State authority. Water quality and impacts to other water users are minor in local area. Sensitive biological resources have minor changes.

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1	<b>Significant Permit Constraints</b> – Challenging permit issues limited to three or more areas of State or Federal permit processes. State or Federal permit requirements in one or more areas require variances or special approvals from headquarters or governing bodies. Water quality and impacts to other water users are major in local area. Sensitive biological resources have potentially significant impacts.
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#### H6.2 Uncertainty of Permitting Process (6C)

Uncertainty of obtaining the permit is very hard to determine because it includes the above factors and a judgement call about the political acceptability of the drainage alternative and the assumptions developed in the analysis of the alternative. Dilution credits may not be allowed even if the flows are mixed within acceptable concentrations for bioaccumulative parameters. Ratings for this factor will be made from the factors above and the sense of acceptability based on the legislation, regulations, and opinions of people contacted in the various agencies. The scoring for this criterion is as follows:

5	Little uncertainty exists about assumptions in permit.
4	Some uncertainty exists about assumptions of permit from a single agency.
3	Some uncertainty exists about assumptions in permits from one or two agencies or special interest groups.
2	Some uncertainty exists about assumptions in permit conditions for more than three agencies or special interest groups.
1	Many questions exist about permit assumptions or approval from multiple agencies and special interest groups.

#### H7 FLEXIBILITY TO MEET CHANGING CONDITIONS (7)

##### H7.1 Potential Future Regulations (7A)

This criterion considers the flexibility to meet more stringent regulations in the future. One way of considering this is an evaluation of the degree to which an alternative can be substantially below discharge requirements or other regulations. For example, if an alternative would discharge water at substantially better quality than regulations would require, flexibility would exist to accommodate potential tightening of regulations in the future. The scoring for this criterion is as follows:

5	Substantially better than discharge requirements in all areas, allowing maximum flexibility if future regulations are more stringent.
3	Moderately better than discharge requirements in all areas or substantially better than requirements in some areas.
1	Marginally meets current discharge requirements, with minimum flexibility to meet more stringent future regulations

##### H7.2 Changes in Drainage Management, Quantity or Quality (7B)

This criterion considers the flexibility to adjust treatment or disposal facilities to adapt to changes in drainage quality or quantity due to improvements or changes in drainage management methods or changes in the physical environment. The scoring for this criterion is as follows:

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5	Has substantial flexibility to adjust to changes in both management methods and drainage quantity and quality
3	Has moderate flexibility to adjust to changes in management methods and drainwater quantity or quality
1	Has limited flexibility to adapt to changes in management methods and drainage quantity and quality

## H8 LAND IMPACTS (8)

Land impacts focuses on potential physical impacts from construction and operation of project components and facilities, and includes direct impacts to terrestrial special-status species and habitats and to human activities and infrastructure in populated urban settings. Direct and indirect impacts resulting from elevated Se concentrations in project drainwater (more characteristically involving aquatic and wetland species and habitats) are addressed separately under *9B3–Potential Wildlife Exposure to Selenium*.

### H8.1 Construction Impacts (impacts that occur during or as a result of actual construction) (8B)

Scale	Rare/protected terrestrial habitats and special-status species
5	No unavoidable significant construction impacts. Mitigation measures, if needed, are only required for minor (i.e., less-than-significant) construction impacts and are easily or routinely implemented. All impacts are minor and typically temporary.
4	Very limited, unavoidable, significant construction impacts. Mitigation measures to reduce significant construction impact to less-than-significant levels are easily implemented at reasonable cost.
3	Limited, unavoidable, significant construction impacts; however, potential impacts are not likely to require work stoppages or redesigns. Mitigation measures for significant construction impacts are difficult and expensive.
2	Unavoidable, significant construction impacts that are likely to require temporary work stoppages or redesigns. Mitigation measures for significant construction impacts are difficult and expensive.
1	Unavoidable, significant construction impacts. Feasible mitigation strategies are not likely to be effective or acceptable. Construction impacts occur in protected lands (Areas of Biological Significance, Critical Habitat, Refuges, Sanctuaries, etc.) Regulatory guidelines, standards, and criteria to protect rare/protected terrestrial habitats and special-status species cannot be met. Project construction may be halted until compliance can be achieved.

Scale	Urban Corridor
5	Conveyance will be constructed through a corridor with houses on 10-acre plots for less than 5 miles long.
4	Conveyance will be constructed through a corridor with houses on 10-acre plot for 5 miles or longer.
3	Conveyance will be constructed through an urban corridor for less than 10 miles.
2	Conveyance will be constructed through a densely populated urban corridor for less than 10 miles.
1	Conveyance will be constructed through a densely populated urban corridor 10 miles or more.

**H8.2                    Operation Impacts (impacts resulting from operation and siting of completed facilities) (8A)**

<b>Scale</b>	<b>Rare/protected terrestrial habitats and special-status species</b>
5	No significant operational impacts. Mitigation measures are only required for minor impacts, are easily or routinely implemented, and do not substantially affect efficient operation.
4	Very limited unavoidable significant operational impacts. Required mitigation measures to reduce significant impacts to less-than-significant levels are easily or routinely implemented; efficient operation is not substantially affected.
3	Limited significant unavoidable operational impacts; mitigation measures to reduce significant impacts to less-than-significant levels are difficult and expensive to implement; efficient operation is not substantially affected.
2	Significant unavoidable operational impacts. Mitigation to reduce significant impacts to less-than-significant levels are difficult, expensive, and likely to limit operation.
1	Unavoidable, unmitigatable, significant operational impacts. Regulatory guidelines, standards, and criteria to protect rare/protected terrestrial habitats and special-status species cannot be met. Project operations may be halted until compliance is achieved.

<b>Scale</b>	<b>Urban Corridor</b>
5	Conveyance will not travel near houses.
4	No operations in an urban corridor.
3	Operators of the conveyance must continually provide quiet operations.
2	Operators of the conveyance must continually operate quiet pumps adjacent to residences in densely populated urban corridors.
1	Operators of the conveyance must continually operate loud pumps adjacent to residences in densely populated urban corridors.

**H9                    RISK (9)**

**H9.1                Hazards (9A)**

**H9.1.1            Earthquake/Seismic Hazard Criterion (9A1)**

This criterion takes into account possible seismic hazards over the 50- to 100-year life of each project alternative, and the possible effects of a seismic event on a given alternative. All proposed alternatives have the probability of experiencing moderate to large earthquake ground motions due to their proximity to potential seismic sources, such as the San Andreas fault, or to sources such as the buried thrust faults that caused the magnitude 6.5 Coalinga earthquake of 1983. Engineering experience in seismic design for pipelines, canals, pumping plants, and evaporation ponds greatly reduces the likelihood of significant environmental consequences due to an earthquake event.

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The scoring for this criterion is as follows:

5	No identified seismic hazards or active fault crossings.
4	Low to moderate probability of being subjected to moderate to large earthquake ground motions over the life of the project alternative. All project features in central San Joaquin Valley. No known active faults identified underlying any project feature.
3	Low to moderate probability of being subjected to moderate to large earthquake ground motions over the life of the project alternative. Special engineering design considerations may be required in some areas where route or facility crosses or is near known active fault(s), or in specific areas with moderate to high ground motion probabilities.
2	Low to high probability of being subjected to moderate to large earthquake ground motions over the life of the project alternative, possible ground rupture hazard at crossing of major active fault. Special engineering design considerations may be required in some areas where route or facility crosses or is near known active fault(s), or in specific areas with moderate to high ground motion probabilities.
1	Moderate to high probability of being subjected to moderate to large earthquake ground motions over the life of the project.

Score	
2	Point Estero , Crosses San Andreas fault
3	Delta disposal, Chipps Island and Carquinez Strait, may cross potentially active faults near the Delta.
4	In-Valley. Project facilities and evaporations ponds mostly near trough of valley, low to moderate probability of being subjected to a large seismic event causing significant damage.

## H9.2 Environmental (9B)

### H9.2.1 Drinking Water Supply (9B1)

The evaluation of the four alternative disposal methods with respect to drinking water supply is based on the several considerations. First, impacts on both groundwater and surface water must be considered. Second, the location of the drainwater outlet relative to the drinking water intake must be ascertained. Third, the impact on fresh surface water for irrigation and domestic use must be considered. Finally, all the parameters of concern to drinking water supply (such as total organic carbon and bromide) have not been modeled. For this reason the ratings were based on probable and perceived risks. The scoring for this criterion is as follows:

Scale	Drinking Water Supply
5	No negative impact on drinking water supply
4	
3	
2	Measurable impact on TDS and Se
1	Negative impact on drinking water supply that will impact regulatory compliance

### Ocean Disposal Alternative

This alternative scores highly on all factors and, therefore, was given a rating of 5. Overall water quality in the study area will improve due to the fact that drainwater will be removed from San Joaquin Valley. As described in the Ocean Disposal Alternative, the salt concentration of the

receiving waterbody is greater than the drainwater, so the impact will be slight if any. The outfall is located more than 20 miles from any known drinking water intake. In fact, the closest intakes are for the Arroyo Grande Water Treatment Plant (22 miles inland from the ocean) and Lompoc Water Treatment Plant (40 miles inland from the ocean).

#### **In-Valley Disposal Alternative**

This alternative scored highly on all factors and was also given a rating of 5. Overall, water quality in the study area will improve due to the fact that drainwater will be treated and the salts and Se disposed of safely. It is estimated that over 70 percent of the drainwater would be disposed of through ET. Following reuse application the remaining drainwater would be treated. The treatment ponds will be double lined and no drainwater would be released to the groundwater. Due to continued irrigation, the drainwater would be replaced with freshwater and it is expected that the salinity of the groundwater in the study area would decrease over time. Because of this fact the salinity impacts on the City of Mendota drinking water wells would diminish.

#### **Delta-Chippis Island Disposal Alternative**

This alternative did not score as well as the two previous alternatives and was rated a 2 in anticipation of negative impacts because of the following reasons. The CCWD intake location at Clifton Court Forebay and Rock Slough are reasonably close to the Chipps Island disposal site. Modeling has shown that the 5-ppb limit for Se would be reached at a depth of approximately 5 meters. The TDS exceedance of 40 ppm probabilities would be reached 60 percent of the time.

#### **Delta-Carquinez Strait Disposal Alternative**

This alternative scored slightly higher than the Delta-Chippis Island Disposal Alternative and was rated a 3 because smaller impacts to drinking water are anticipated. This rating is due to the fact that the Chipps Island site is farther away from the drinking water intakes at Clifton Court Forebay and Rock Slough.

### ***H9.2.2       Salts Disposal (9B2)***

This criterion considers the ability of an alternative to remove salts from the Central Valley water cycle, either through upland disposal or productive use. The scoring for this criterion is as follows:

5	Removes all salts from the Central Valley water cycle either through storage in an upland location or through use as a product.
3	Substantially removes salt from the Central Valley water cycle.
1	Has limited ability to remove salt from the Central Valley Water cycle.



**H9.2.3      *Potential for Wildlife Exposure to Selenium (9B3)***

This criterion considers whether an alternative would result in potential wildlife exposure to Se. The scoring for this criterion is as follows:

5	Alternative includes only limited areas with potential risk for exposure to wildlife sensitive to Se.
3	Alternative includes moderate areas with potential risk for exposure to wildlife sensitive to Se.
1	Alternative has substantial areas with potential exposure to wildlife sensitive to Se uptake.